

WE CLAIM AS OUR INVENTION:

1. A cooling arrangement for an X-ray tube having a housing with an exterior projection forming a corner having an exterior surface, said cooling arrangement comprising:

an element adapted to fit over said exterior of said corner, said element having an element surface facing said exterior surface of said corner, said element surface, in combination with said exterior surface of said corner, forming a channel adapted to allow flow of a coolant therethrough.

2. A cooling arrangement as claimed in claim 1 wherein said projection is generally cylindrical, and wherein said element comprises a U-shaped element having two legs straddling said generally circular projection.

3. A cooling arrangement as claimed in claim 2 wherein said U-shaped element is an electromagnetic yoke adapted to interact with, and deflect, an electron beam during operation of said X-ray tube.

4. A cooling arrangement as claimed in claim 1 wherein said element surface is flat.

5. A cooling arrangement as claimed in claim 1 wherein said element surface, in combination with said exterior surface of said corner, defines a generally triangular cross-section of said channel.

6. A cooling arrangement as claimed in claim 1 wherein said channel has a channel opening, and wherein said cooling arrangement comprises a nozzle having a nozzle opening disposed at said channel opening adapted to direct a flow of coolant through said channel opening and through said channel.

7. A cooling arrangement as claimed in claim 6 wherein said projection is generally cylindrical and wherein said element has a U-shape with two legs straddling said generally circular projection, and forming two channels on opposite sides of said generally circular projection, and wherein said nozzle has a V-shape with two nozzle openings respectively disposed adjacent said channels.

8. An x-ray source comprising:

an X-ray tube having an evacuated housing containing an interior space and having a housing projection forming a chamber in communication with said interior space via a neck region of said housing, said neck region forming a corner at an exterior of said housing;

a cathode disposed in said chamber and an anode disposed in said interior space, said cathode emitting an X-ray beam that proceeds through said neck region and strikes said anode at a focus to generate X-rays from said focus; and

an electron beam deflector disposed at an exterior of said neck region of said housing for generating a magnetic field that interacts with said electron beam to deflect said electron beam to adjust a position of said focus on said anode, said electron beam deflector having a U-shape with two legs straddling said neck region at said corner, each of said legs having a surface facing said corner and each surface in combination with said corner forming a channel adapted to allow a flow of coolant therethrough.

9. An X-ray source as claimed in claim 8 wherein each of said channels has a channel opening, and wherein said X-ray source comprises a nozzle having at least one nozzle opening disposed adjacent to said channel openings for directing a flow of coolant through said channel openings and through said channels.

10. An X-ray source as claimed in claim 9 wherein said nozzle has a V-shape and has two nozzle openings respectively disposed adjacent said channel openings.

11. An X-ray source as claimed in claim 8 wherein the respective surfaces of said legs facing said corner are flat, and define a generally triangular cross-section for said channels in combination with said corner.

12. A method for cooling an X-ray tube having an evacuated housing with a projection forming a corner at an exterior of the housing, comprising the steps of:

forming a channel for a coolant by placing an element over said corner having a surface facing said corner to define, in combination with the exterior of the housing at said corner, said channel; and
conducting coolant through said channel.

13. A method as claimed in claim 12 wherein said projection is generally cylindrical, and wherein the step of forming said channel comprises straddling said generally cylindrical projection with respective legs of a U-shaped element to form two channels for coolant flow, and conducting coolant through each of said two channels.

14. A method as claimed in claim 13 wherein the step of conducting coolant through each of said two channels comprises disposing a nozzle having V-shape at an end of each of said two channels, and discharging coolant from said nozzle through each of said two channels.

15. A method as claimed in claim 12 wherein the step of conducting coolant through said channel comprises disposing a nozzle having a nozzle opening at one end of said channel, and discharging coolant from said nozzle through said channel.

16. A method as claimed in claim 12 comprising employing an electromagnetic yoke, for generating a magnetic field that interacts with an electron beam in said X-ray tube during operation of said X-ray tube, as said U-shaped element.